FLOOD INSURANCE STUDY

DEFIANCE COUNTY, OHIO
UNINCORPORATED AREAS

AUGUST 2, 1990

Federal Emergency Management Agency

COMMUNITY NUMBER - 390143

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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FLOOD INSURANCE STUDY

DEFIANCE COUNTY,
UNINCORPORATED AREAS,
OHIO

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Unincorporated Areas of Defiance County, Ohio, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The hydrologic and hydraulic analyses for this study were performed by the U.S. Army Corps of Engineers (COE), Buffalo District (the Study Contractor) for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-86-E-2226, Project Order No. 16. This study was completed in September 1987. Additional hydrologic and hydraulic information for this study was taken from a Special Flood Hazard Evaluation Report for the Maumee River in Defiance and Paulding Counties, Ohio (Reference 1).

1.3 Coordination

On October 29, 1985, an initial meeting was held with representatives of FEMA, the Ohio Department of Natural Resources (ODNR), Defiance County, and the Study Contractor to determine the streams to be studied.

On September 15, 1989, the results of this Flood Insurance Study were reviewed and accepted at a final coordination meeting attended by representatives of the Study Contractor, FEMA, and the community.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the unincorporated areas of Defiance County, Ohio. The area of study is shown on the Vicinity Map (Figure 1). The incorporated areas within the county were excluded from this study.

Flooding caused by overflow of the Maumee River, the Auglaize River, the Tiffin River, and Preston Run was studied in detail.

Areas having low development potential or minimal flood hazards were previously studied using approximate analyses. The results were shown on the Flood Hazard Boundary Map for Defiance County, Ohio (Reference 2) and are incorporated into this Flood Insurance Study.

The areas studied were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through September 1992. The scope and methods of study were proposed to and agreed upon by FEMA and Defiance County.

2.2 Community Description

Defiance County is in northwestern Ohio and is bordered by DeKalb and Allen Counties, Indiana, on the west; Williams and Henry Counties, Ohio, on the north; Henry County, Ohio, on the east; and Paulding and Putnam Counties, Ohio, on the south. Defiance County is primarily rural, and had a reported 1980 population of 39,987 (Reference 3). Major transportation routes serving Defiance County include U.S. Routes 24 and 127; State Routes 2, 15, 18, 49, 66, 111, 249, 281, 424, and 624; and the Wabash Railroad.

Defiance County is influenced by a climate which is continental in nature. This climate is characterized by moderate extremes of temperature and precipitation. The maximum temperature of 102 degrees Fahrenheit (^{o}F) was recorded at the nearest climatological data station in September 1953, and a minimum of -19^{o}F was recorded in January 1972. The maximum 24-hour rainfall was 6.39 inches recorded on September 14, 1972, and the maximum 24-hour snowfall was 12.0 inches, recorded on December 20, 1973 (Reference 4).

2.3 Principal Flood Problems

Records of river stages and discharges on the Maumee River have been maintained since 1898. Significant floods (those with peak discharges over 50,000 cubic feet per second (cfs)) have occurred at least once in each decade since 1913. All of the highest

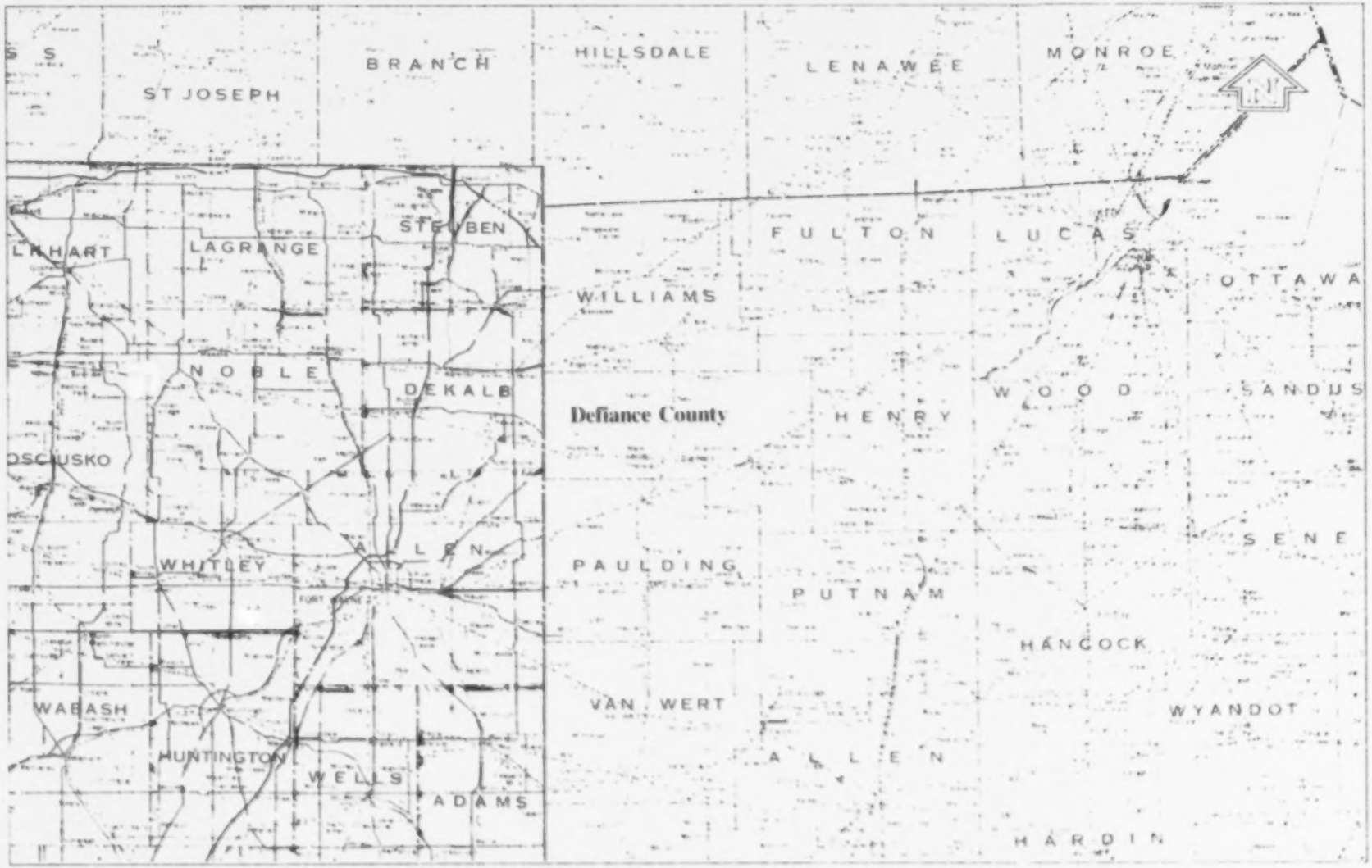

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

DEFIANCE COUNTY, OH
(UNINCORPORATED AREAS)

APPROXIMATE SCALE

16 0 16 32 48 MILES

VICINITY MAP

known floods on the Maumee River have occurred during the winter or spring. However, intense local thunderstorms can occur in the summer and cause local flooding.

The greatest known flood to have occurred on the Maumee River was in March 1913. Records indicate that the 1913 flood discharge (138,500 cfs) was approximately 60-percent greater than the next highest known flood discharge. The event occurred as a result of two intense frontal storms that passed over Ohio from west to east between March 23 and 27. Rainfall averaged between 6 and 7 inches over the entire Maumee River Basin, with 6.5 inches recorded at Defiance (Reference 5).

Numerous major floods have occurred since the 1913 flood. The most recent flood (March 1982) was caused by rain and snowmelt in the upper Maumee River basin. Unseasonably warm temperatures combined with precipitation maintained high-water levels and extended the period of flooding. Three lives were lost and 876 people were evacuated from Defiance and Paulding Counties. Additional damage in the two counties included 9.5 percent of farmland flooded and damage to dwellings, commercial and public buildings, sewer systems, roads, and bridges (Reference 6).

2.4 Flood Protection Measures

Flood protection measures are not known to exist within the study area.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that is expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent chance of annual exceedence) in any 50-year period is approximately 40-percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60-percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each riverine flooding source studied in detail affecting the community.

Three U.S. Geological Survey (USGS) gages are located along the Maumee River in Ohio. The gages are located at Waterville, downstream of the study area; Defiance, downstream of the Auglaize River; and Antwerp, which is 7 miles downstream of the Indiana border. Discharge frequency relationships were determined at these three gaged sites.

The Maumee River, above its confluence with the Auglaize River, has a drainage area of 3,094 square miles. Just downstream of the Auglaize River confluence, the Maumee River drainage area is 5,545 square miles. Due to the large difference in drainage area upstream and downstream of the Auglaize River confluence, two separate discharge-frequency relationships were required at Defiance. A subtraction method of estimating the discharges of the Maumee River above the Auglaize River was used to estimate peak discharges. The values were then used as input into the Flood Flow Frequency Analysis computer program (Reference 7) to determine the discharge-frequency relationship for the Maumee River above the Auglaize River.

The discharge-frequency relationships of the four sites were used to develop discharge-frequency vs. drainage area curves. Because only two points were available upstream of the Auglaize River, and two downstream, a simple straight line relationship between each set of points was used to represent intermediate areas. The equation for these lines are presented below.

Between the western state boundary and Defiance, Ohio, (upstream of the Auglaize River):

$$Q100 = (21.14)(DA) - 15{,}807$$

Between Defiance, Ohio, and the mouth (downstream of the Auglaize River):

$$Q100 = (19.108)(DA) + 2{,}046$$

where: $Q100$ = 100-year peak discharge in cfs
DA = drainage area for the study reach in square miles

One USGS gage is located on the Auglaize River near the City of Defiance, Ohio, just downstream of the spillway. The spillway is the downstream limit of the detailed study reach on the Auglaize River. The 100-year discharge for the Auglaize River was calculated using the data from that gage. Because there is

little flood control storage behind the dam and spillway, it was assumed that the inflow to the reach would equal the outflow (gage reading) for larger floods.

Another USGS gage is located on the Tiffin River at Stryker, Ohio, about 17 miles upstream of the study area. The 100-year discharge was calculated for the Tiffin River using data from this gage and Bulletin 45 guidelines (Reference 8) for the ungaged sites on gaged streams. A correction factor was developed using Equation 31 of Bulletin No. 45 (Reference 8) and applied to the discharge computed using Bulletin No. 45 for the ungaged site used in this study.

The 100-year discharge for Preston Run was calculated using Bulletin No. 45 (Reference 8), while the drainage areas and slope were calculated using topographic maps (Reference 9). The average annual precipitation values were taken from Figure 3 of Bulletin No. 45.

Peak discharge-drainage area relationships for the 100-year flood of each flooding source studied in detail in the community are shown in Table 1.

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 100-YEAR
MAUMEE RIVER		
at Independence Dam	5,545	108,000
just upstream of confluence of Auglaize River	3,094	49,600
just upstream of confluence of Tiffin River	2,315	33,100
just upstream of confluence of Gordon Creek	2,207	30,800
AUGLAIZE RIVER		
at spillway	2,318.0	70,700
TIFFIN RIVER		
at confluence of unnamed tributary downstream of Evansport	557.1	11,900

TABLE 1 - SUMMARY OF DISCHARGES (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 100-YEAR
PRESTON RUN		
about 1,050 feet downstream of Dohoney Road	4.8	400
at confluence of Tributary P	2.0	200

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross sections for the Maumee River, the Auglaize River, the Tiffin River, and Preston Run were obtained by field survey. Bridges were surveyed to obtain elevation data and structural geometry. Additional data in the overbank areas were obtained from topographic maps (Reference 9).

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles and on the Flood Insurance Rate Map.

Roughness coefficients (Manning's "n") and contraction and expansion loss coefficients used in the hydraulic computations were chosen by engineering judgment and based on field observation of the streams and floodplain areas. Coefficients for the streams studied are shown in the table below.

MANNING'S "n" COEFFICIENTS

FLOODING SOURCE	CHANNEL	OVERBANK	CONTRACTION	EXPANSION
Maumee River	0.025-0.046	0.050-0.060	0.2	0.4
Auglaize River	0.035	0.07	0.1-0.3	0.3-0.5
Tiffin River	0.045	0.1	0.1	0.3
Preston Run	0.05-0.07	0.08-0.1	0.1-0.3	0.3-0.5

The starting water-surface elevation for the Maumee River in Defiance County was taken from the flood profile shown in the Special Flood Hazard Evaluation Report on the Maumee River in Henry County, Ohio (Reference 10).

The starting water-surface elevation for the Auglaize River was obtained from the rating curve developed for the Power Dam Corporation (Reference 11). Starting water-surface elevations used for the Tiffin River and Preston Run were developed using normal-depth calculations.

Water-surface profiles were developed using the HEC-2 step-backwater computer program (Reference 12) for the Maumee River, the Auglaize River, the Tiffin River, and Preston Run upstream of Eunice Street.

Some special considerations were required for Preston Run. A water-surface elevation for calculations beginning at the Eunice Street bridge was computed on the basis of bridge geometry and road profile obtained from the field survey. The bridge opening consists of three culverts. Flow passing through the culverts was calculated as orifice flow, $Q = C_d A \sqrt{2gH}$, where the discharge coefficient C_d = 0.65. Water flowing over the top of the bridge and over the roadway was calculated as weir flow, using a weir coefficient equal to 3 (a relatively high value chosen since most of the flow was expected to be over the roadway). A trial-and-error method was then used to obtain the expected water-surface elevation for the given discharge.

Normal-depth calculations were used downstream of Eunice Street. This procedure was adopted because it was determined that the Dohoney Street bridge did not provide any control for the flow and also because of extreme difficulty in obtaining survey data due to heavy vegetation. Surveyed cross sections taken between the Eunice Street and Dohoney Street bridges were combined to define an average cross section in this area. Map contours and field notes were used to estimate an average slope and, using a trial-and-error method, normal depth was calculated from Manning's equation. A similar procedure was used to calculate depth at the Dohoney Street bridge and it was determined that the flood remained below the bridge. In order to calculate the profile downstream of the Dohoney Street bridge it was assumed that the channel maintained the same basic shape and slope as in the area upstream of the bridge.

In the vicinity of Evansport, floodwaters of the Tiffin River escape the right bank approximately 700 feet upstream of State Route 191 bridge in Williams County and cause sheet flow flooding over State Route 191 in Williams County. The water- surface elevation 700 feet upstream of the bridge for 100-year flood is 691.7 feet National Geodetic Vertical Datum of 1929 (NGVD) (Reference 13).

Flood profiles were drawn showing the computed water-surface elevations for floods of the selected recurrence intervals.

The hydraulic analyses for this study are based on the effects of unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the NGVD. Elevation reference marks used in this study are shown on the map and described in the exhibit labeled Elevation Reference Marks.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24000 with a contour interval of 5 feet (Reference 9).

The 100-year floodplain boundaries are shown on the Flood Insurance Rate Map. On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, AH, AO, A99, V, and VE). Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 100-year floodplain boundary was delineated using the Flood Hazard Boundary Map for the Unincorporated Areas of Defiance County (Reference 2).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces the flood-carrying capacity, increases the flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 100-year flood can be carried without

substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways for this study were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections and are shown in Table 2, Floodway Data. The computed floodways are shown on the Flood Insurance Rate Map. In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown. Portions of the floodways for the Maumee River lie outside the county boundary.

Along streams where floodways have not been computed, the community must ensure that the cumulative effect of development in the floodplain will not cause more than 1.0-foot increase in the base flood elevations at any point within the community.

The area between the floodway and the 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
MAUMEE RIVER								
A	307,130	985	21,832	5.0	670.0	670.0	670.8	0.8
B	313,150	695	14,187	7.6	671.7	671.7	672.6	0.9
C	315,180	909	18,478	5.9	672.5	672.5	673.4	0.9
D	319,220	801	18,993	5.7	675.1	675.1	675.7	0.6
E	320,633	687	18,175	5.9	675.3	675.3	675.9	0.6
F	323,940	670	17,730	6.1	675.7	675.7	676.3	0.6
G	328,322	630	16,133	6.7	676.3	676.3	677.0	0.7
H	346,386	638[2]	12,960	3.8	680.6	680.6	681.4	0.8
I	347,970	1232[2]	18,485	2.7	680.9	680.9	681.7	0.8
J	355,575	521	10,401	3.2	682.1	682.1	683.0	0.9
K	360,610	840	13,728	2.4	683.0	683.0	683.8	0.8
L	363,230	434	8390	3.9	683.4	683.4	684.2	0.8
M	368,150	447	8160	4.1	684.5	684.5	685.5	1.0
N	376,250	1255	14,647	2.3	687.0	687.0	688.0	1.0
O	381,850	360	8587	3.9	688.0	688.0	688.9	0.9
P	389,700	1407	18,888	1.8	689.5	689.5	690.4	0.9
Q	400,000	1943	25,375	1.3	690.7	690.7	691.6	0.9
R	406,000	1772	26,223	1.3	691.4	691.4	692.3	0.9
S	409,900	2058	25,087	1.3	691.6	691.6	692.5	0.9
T	416,600	807	11,124	2.9	692.2	692.2	693.1	0.9
U	421,300	1179	14,801	2.2	693.1	693.1	694.0	0.9
V	425,219	1829	21,669	1.5	694.2	694.2	695.1	0.9
W	430,000	1396	19,792	1.6	694.5	694.5	695.4	0.9

[1]FEET ABOVE MOUTH
[2]THIS WIDTH EXTENDS WITHIN AREA NOT INCLUDED

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

DEFIANCE COUNTY, OH
(UNINCORPORATED AREAS)

FLOODWAY DATA

MAUMEE RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
AUGLAIZE RIVER								
A	31,350	840	17,163	4.1	699.6	699.6	699.7	0.1
B	34,310	841	17,410	4.1	700.3	700.3	700.4	0.1
C	39,040	738	16,163	4.4	701.1	701.1	701.2	0.1
D	42,000	786	17,202	4.1	701.6	701.6	701.8	0.2
TIFFIN RIVER								
A	19,000[2]	738	6241	1.9	685.8	685.8	685.9	0.1
B	21,130[2]	142	1865	6.4	687.2	687.2	687.7	0.5
C	23,000[2]	777	7433	1.6	688.6	688.6	689.4	0.8
D	25,000[2]	539	5671	2.1	689.0	689.0	689.8	0.8

[1]FEET ABOVE MOUTH
[2]FEET ABOVE STEVER ROAD

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

DEFIANCE COUNTY, OH
(UNINCORPORATED AREAS)

FLOODWAY DATA

AUGLAIZE RIVER–TIFFIN RIVER

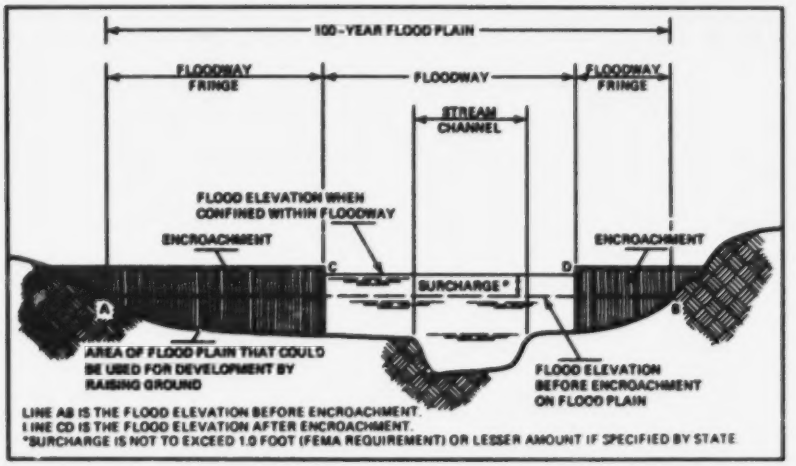
100-YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE AB IS THE FLOOD ELEVATION BEFORE ENCROACHMENT.
LINE CD IS THE FLOOD ELEVATION AFTER ENCROACHMENT.
*SURCHARGE IS NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE

FIGURE 2 - Floodway Schematic

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 100-year floodplain, areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood

elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols the 100- and 500-year floodplains, the floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

7.0 OTHER STUDIES

The Flood Insurance Study published for DeKalb County, Indiana (Reference 14) is in agreement with this study.

The Flood Insurance Rate Maps printed for Williams County, Ohio, and the Village of Hicksville, Ohio (References 15 and 16) are in agreement with this study.

The Flood Insurance Studies in progress for Paulding and Putnam Counties, Ohio, and Allen County, Indiana (References 17-19) are in agreement with this study.

The Flood Insurance Study published for the City of Defiance, Ohio (Reference 20) is not in agreement with this study, which is based upon an analysis of the entire Maumee River within Defiance County. The study for the City of Defiance presents information based upon an analysis of the Maumee River in the immediate vicinity of the city. A revision to the Flood Insurance Study for the City of Defiance will be processed in the future.

This Flood Insurance Study supersedes the previously printed Flood Hazard Boundary Map for Defiance County, Ohio (Reference 2).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, 175 West Jackson Boulevard, 4th Floor, Chicago, Illinois 60604-2698.

Future revisions may be made that do not result in the republishing of the Flood Insurance Study report. To assure that any user is aware of all revisions, it is advisable to contact the map repository of flood hazard data located in the community.

9.0 REFERENCES AND BIBLIOGRAPHY

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7. U.S. Army Corps of Engineers, Hydrologic Engineering Center, Flood Flow Frequency Analysis, Computer Program 723-X6-L7550, Davis, California, December 1983, with updates.

8. Ohio Department of Natural Resources, Division of Water, Bulletin 45, Floods in Ohio, Magnitude and Frequency, E.E. Webber and W.P. Bartlett, Columbus, Ohio, May 1977.

9. U.S. Geological Survey, 7.5 Minute Series Topographic Maps, Scale 1:24000, Contour Interval 5 Feet: Ayersville, Ohio, photorevised 1973; Defiance East, Ohio, photorevised 1979; Defiance West, Ohio, photorevised 1979; Evansport, Ohio, photorevised 1973; Florida, Ohio, photorevised 1973; Junction, Ohio, photorevised 1973; Sherwood, Ohio, photorevised 1973.

10. U.S. Army Corps of Engineers, Buffalo District, Special Flood Hazard Evaluation Report, Maumee River, Henry County, Ohio, September 1987.

11. Protrans Consultants, Preliminary Report to Division of Water, ODNR, Supporting the Application for Permit for Installing Flashboards Atop the Crest of Dam at the Auglaize River, Mile 5.85, April 1987.

12. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Computer Program 723-X6-L202A, Davis, California, April 1974.

13. Jones & Henry Engineers, Evansport Waste Water Treatment Plant Study, Toledo, Ohio, 1975.

14. Federal Emergency Management Agency, Flood Insurance Study, DeKalb County, Unincorporated Areas, Indiana, January 1989.

15. ----------, Flood Insurance Rate Map, Williams County, Unincorporated Areas, Ohio, August 1987.

16. ----------, Flood Insurance Rate Map, Village of Hicksville, Defiance County, Ohio, August 1987.

17. ----------, Flood Insurance Study, Paulding County, Unincorporated Areas, Ohio, in progress.

18. ----------, Flood Insurance Study, Putnam County, Unincorporated Areas, Ohio, December 5, 1989.

19. ----------, Flood Insurance Study, Allen County, Unincorporated Areas, Indiana, in progress.

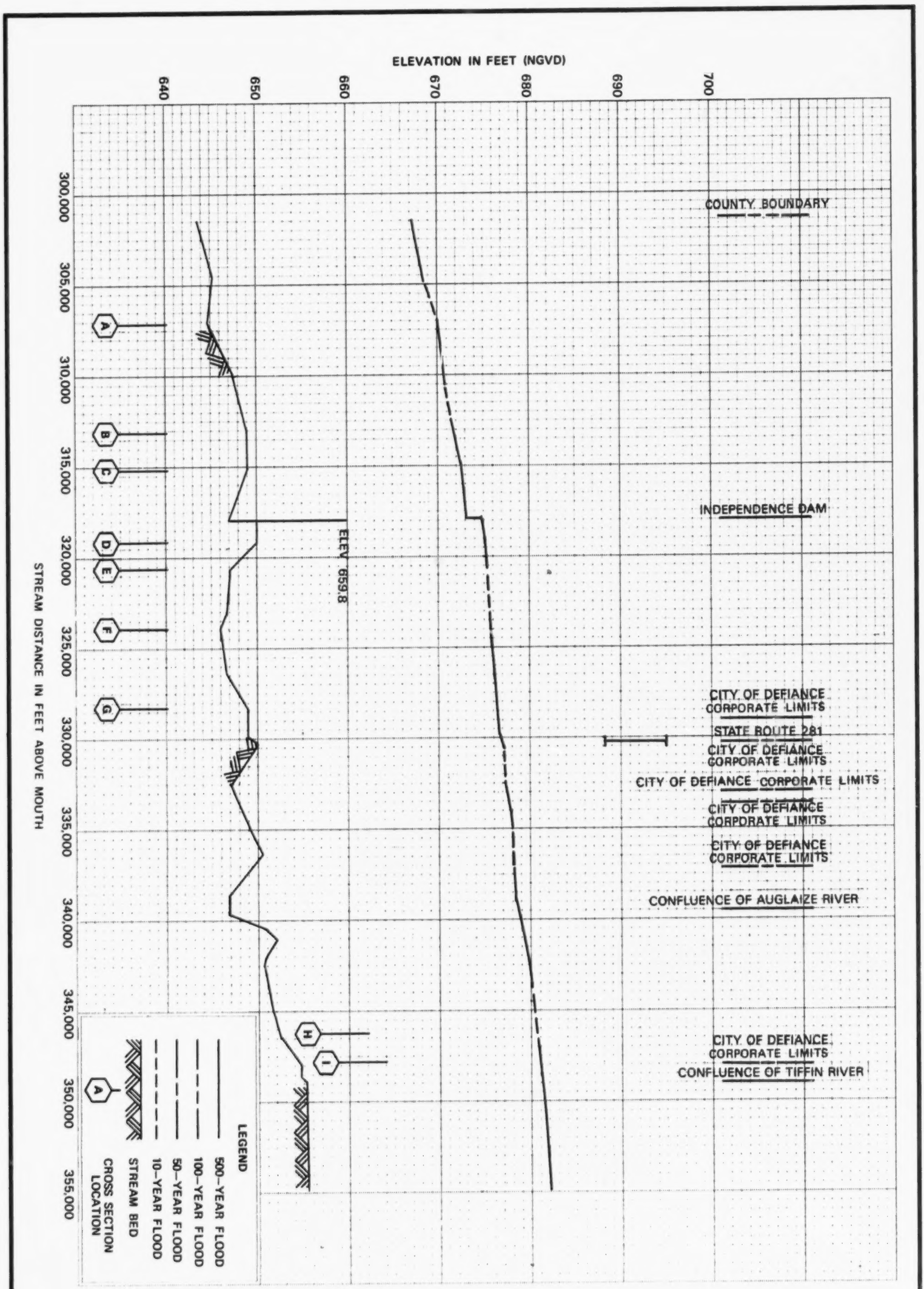
20. ----------, Flood Insurance Study, City of Defiance, Defiance County, Ohio, March 1985.

ELEVATION REFERENCE MARKS

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
1	0130	676.87	U.S. Geological Survey standard brass disk set in top of concrete headwall on north side of Independence Dam on the Maumee River
2	0130	692.66	PK nail in south face of second telephone pole located east of Adams Ridge Road intersection, on north side of State Route 424
3	0130	694.11	chiseled square in northwest corner of base of north parapet of State Route 281 bridge over the Maumee River
4	0130	720.35	spike in power pole located at northwest corner of intersection of Upton Road and Riverview Drive
5	0130	672.31	U.S. Army Corps of Engineers bronze disk set in headwall about 26 feet south of centerline of State Route 424, 25 feet west of intersection with Carpenter Road
6	0110	698.70	chiseled square in northwest corner of northwest wingwall of U.S. Route 24 bridge over the Maumee River
7	0110	704.99	boat spike in south face of third power pole located east of Dowe Road, on north side of Switzer Road
8	0110	709.73	pk nail in northeast face of power pole No. 1657 located at southwest corner of intersection of U.S. Route 24 and Ashwood Road
9	0110	700.84	U.S. Geological Survey standard tablet set in south concrete wall of southernmost sluiceway located 9 feet west of brick building, 2 feet north of guard fence of the Auglaize River hydroplant; north of intersection of Campbell Road and Watson Road

ELEVATION REFERENCE MARKS (Continued)

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
10	0105	714.68	top of concrete right-of-way marker located 26 feet north and 18 feet east of intersection of State Route 18 and Mulligans Bluff Road
11	0105	704.73	southwest corner of southwest wingwall of Wabash Railway bridge over the Maumee River, east of Bend Road
12	0105	689.25	northwest corner of northeast wingwall of the Bend Road bridge over the Maumee River
13	0105	706.39	chiseled square in south corner of northwest wingwall of Wabash Railway bridge over the Maumee River
14	0105	702.43	Ohio Department of Transportation brass disk set in northeast wingwall of U.S. Route 127 bridge over the Maumee River
15	0130	704.71	chiseled square located on top of northwest wingwall at Dohoney Road bridge over Preston Run
16	0130	718.29	chiseled square located on west abutment of Fullmer Road bridge over Preston Run
17	0032	695.95	chiseled square located on southwest wingwall side of County Route 1 bridge over the Tiffin River



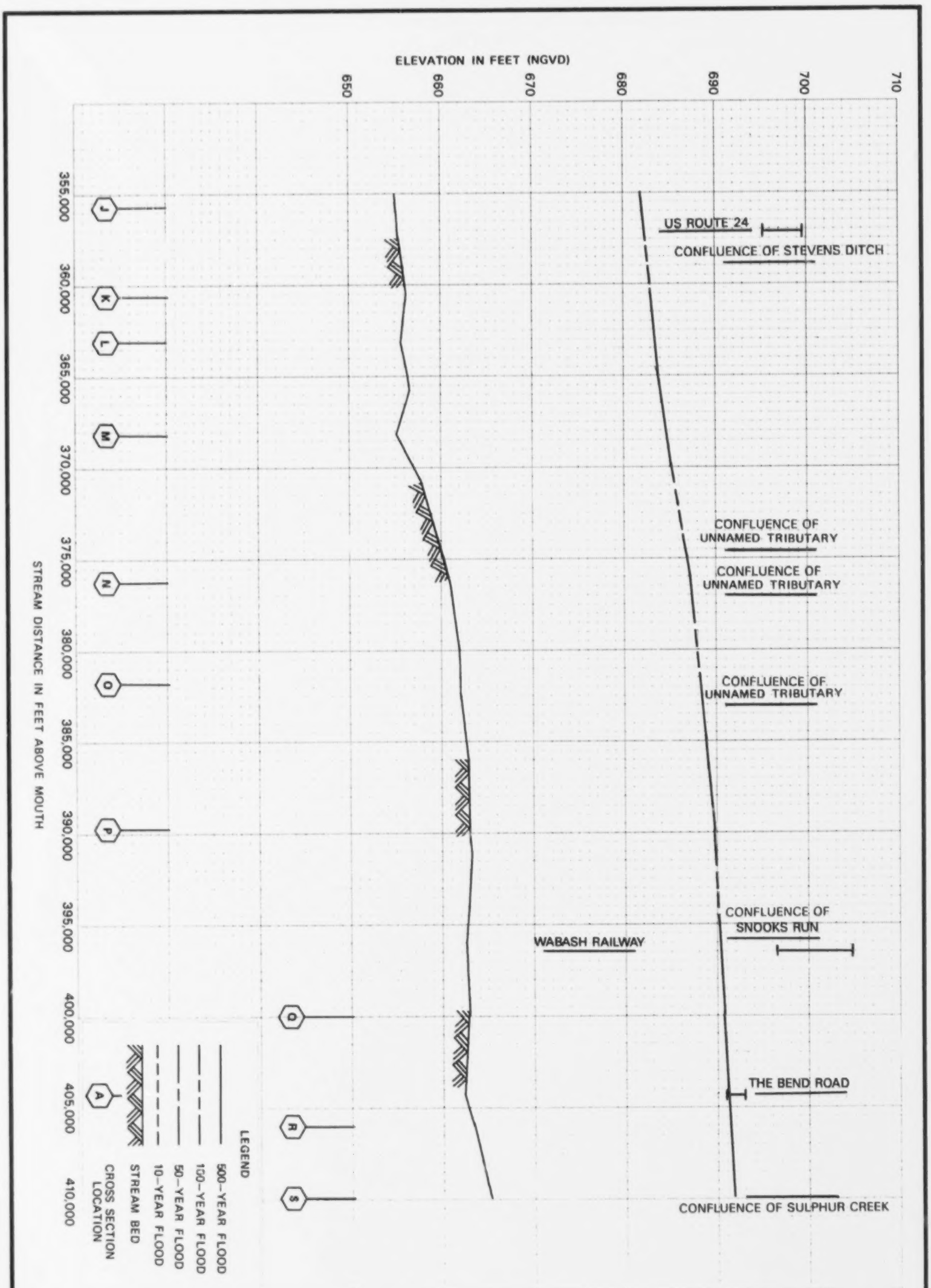
01P

FEDERAL EMERGENCY MANAGEMENT AGENCY

DEFIANCE COUNTY, OH
(UNINCORPORATED AREAS)

FLOOD PROFILES

MAUMEE RIVER



02P

FEDERAL EMERGENCY MANAGEMENT AGENCY

DEFIANCE COUNTY, OH
(UNINCORPORATED AREAS)

FLOOD PROFILES

MAUMEE RIVER

ELEVATION IN FEET (NGVD)

660 670 680 690 700 710

410,000 415,000 420,000 425,000 430,000 435,000

STREAM DISTANCE IN FEET ABOVE MOUTH

T U V W

CONFLUENCE OF PLATTER CREEK

CONFLUENCE OF UNNAMED TRIBUTARY

WABASH RAILWAY

US ROUTE 127

CONFLUENCE OF PLATTER CREEK CUTOFF

CONFLUENCE OF GORDON CREEK

COUNTY BOUNDARY

LEGEND

500-YEAR FLOOD

100-YEAR FLOOD

50-YEAR FLOOD

10-YEAR FLOOD

STREAM BED

A CROSS SECTION LOCATION

21

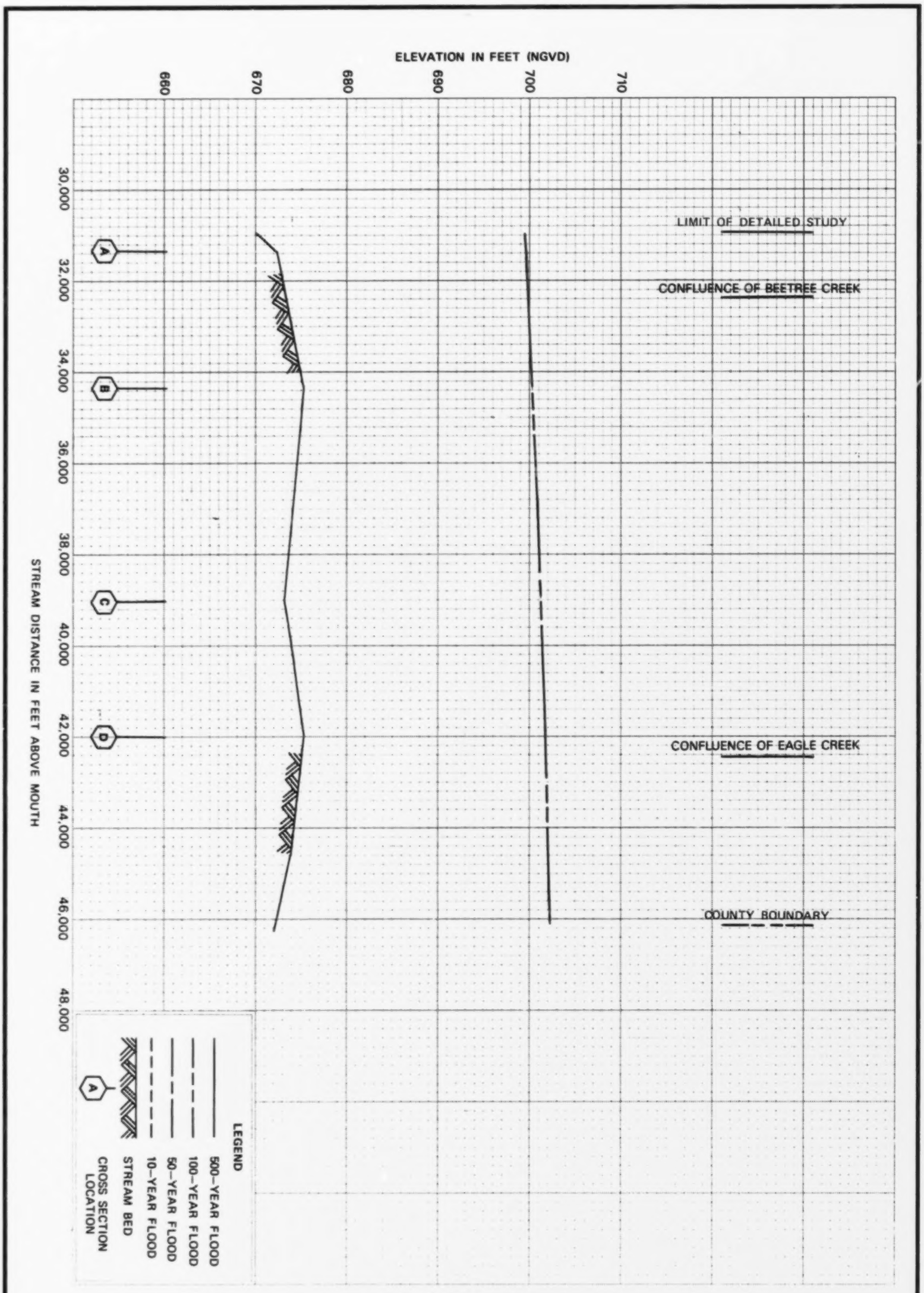
03P

FEDERAL EMERGENCY MANAGEMENT AGENCY

DEFIANCE COUNTY, OH
(UNINCORPORATED AREAS)

FLOOD PROFILES

MAUMEE RIVER



21

04P

FEDERAL EMERGENCY MANAGEMENT AGENCY

DEFIANCE COUNTY, OH
(UNINCORPORATED AREAS)

FLOOD PROFILES

AUGLAIZE RIVER

ELEVATION IN FEET (NGVD)

665 670 675 680 685 690 695

STREAM DISTANCE IN FEET ABOVE STEVER ROAD

19,000 20,000 21,000 22,000 23,000 24,000 25,000 26,000 27,000 28,000 29,000

A B C D

LIMIT OF DETAILED STUDY

CONFLUENCE OF COON CREEK

COUNTY ROUTE 1

COUNTY BOUNDARY

COUNTY BOUNDARY

COUNTY BOUNDARY

LIMIT OF FLOODING AFFECTING COMMUNITY

LEGEND

500-YEAR FLOOD

100-YEAR FLOOD

50-YEAR FLOOD

10-YEAR FLOOD

STREAM BED

A CROSS SECTION LOCATION

9-3

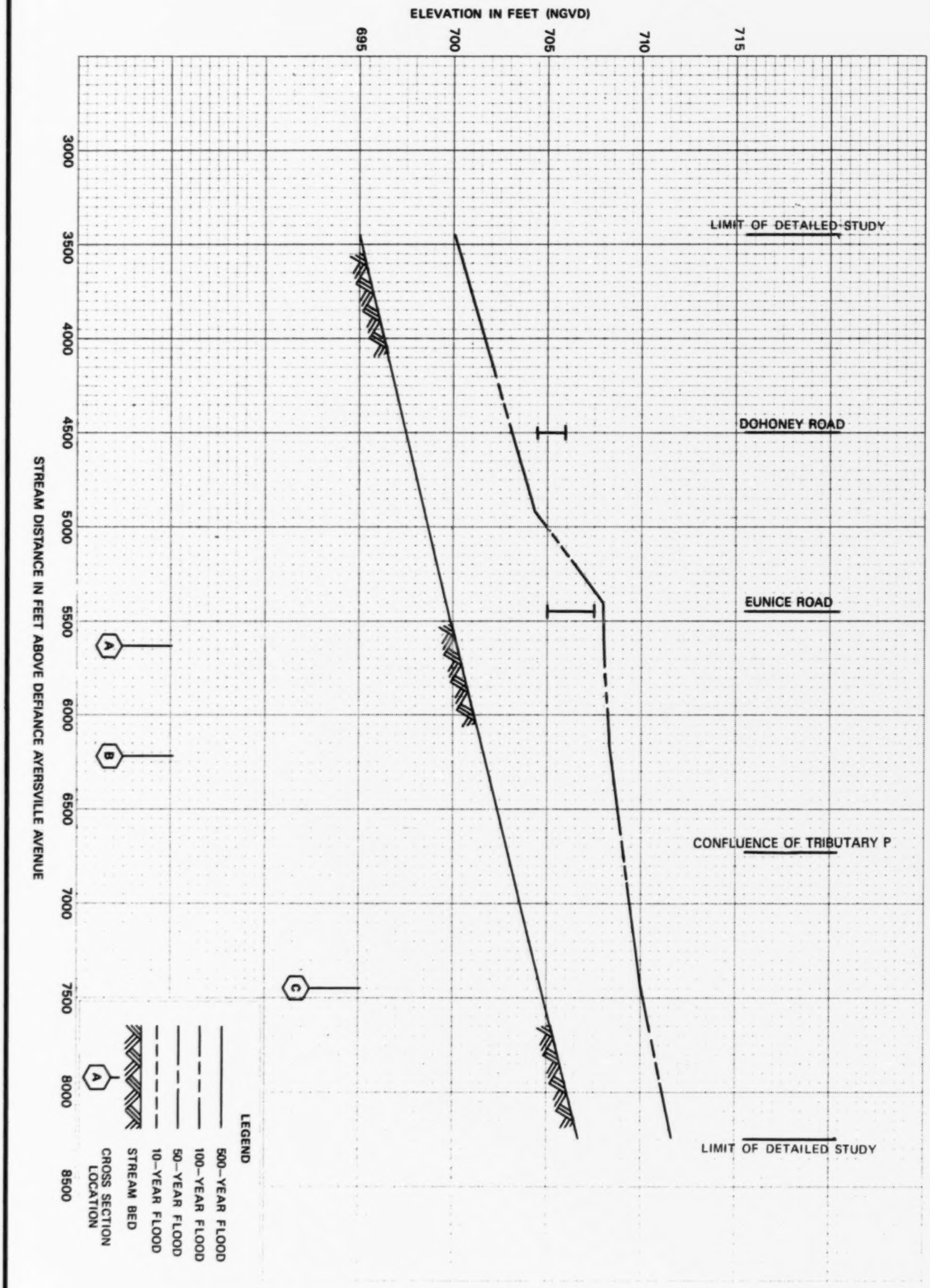
05P

FEDERAL EMERGENCY MANAGEMENT AGENCY

DEFIANCE COUNTY, OH
(UNINCORPORATED AREAS)

FLOOD PROFILES

TIFFIN RIVER



06P

FEDERAL EMERGENCY MANAGEMENT AGENCY

DEFIANCE COUNTY, OH
(UNINCORPORATED AREAS)

FLOOD PROFILES

PRESTON RUN